XXX.—*Blood-Relationship in Marriage considered in its Influence upon the Offspring.* By Arthur Mitchell, A.M., M.D., F.R.S.E., F.A.S.L., etc., Deputy Commissioner in Lunacy for Scotland.

A series of quotations might easily be given to show that there exists a remarkable difference of opinion as to the influence which consanguinity in the parentage exercises upon the offspring.

Further,—such a series of quotations could not be made, on anything like an extended scale, without finding that Scotland is pointed at as occupying a peculiar position in relation to the subject.

The voice of the people in this country, whatever its practice may do, condemns blood-alliances, and declares them to be productive of evil. Educated and uneducated may be said to entertain this belief equally; and as every one has considerable opportunities of testing its accuracy by personal observation and experience, the probability of its being simply and wholly a traditional error becomes small. Even among professional men, there is scarcely less unanimity in this general condemnation. But their wider knowledge and habits of closer observation lead often to qualifications and doubts; while occasionally we find an investigator wholly denying the evil, and characterising the dread of such unions as "a superstitious fear".

If we carefully study the literature of the subject we shall find that it abounds in unsupported assertion, and that important conclusions are very often made to rest on a basis which is undefined or clearly too narrow. Yet, somehow, in spite of this, we rise from such a study with little doubt as to the reality of some evil effect, though we may feel strongly that its character and its measure are not well-known, and that of the nature of those conditions by which it is evidently modified we are still very ignorant.

Both general and professional opinions on this subject rest, in no small degree, on a peculiar and faulty kind of evidence. When we are presented with the question,—"Does consanguinity in parentage appear to injure the offspring?" memory searches for instances of unions of kinship, from the history of which the answer is to be framed. Now, it is certain that all

those which have been marked by misfortune will be first called up, while many of those which have exhibited no evil effect or no peculiarity of any sort will be passed over or forgotten. The attention, in all likelihood, has been frequently drawn to the first, while nothing may have occurred in the progress of the last to keep alive the recollection of relationship in the union. I need scarcely say that facts collected in this manner are almost sure to lead to inferences beyond the truth, yet it is from such data that conclusions on this subject have frequently, if not usually, been drawn.

During the course of 1860, I collected some evidence of this character myself. It embraces the history, more or less complete, of 45 cases. They belong chiefly to one district of Scotland, and are nearly all from the upper and middle classes of society. Without exception, every case communicated to me during the period of my inquiry is included; my informants were intelligent and observing men, and their statements I believe to be substantially correct. The result I give below:—

In 8 cases no evil result was observed.

In 8 cases sterility (virtual or actual) followed.

The 29 cases which remain gave,—

8 Idiots.
5 Imbeciles.
11 Insane (mania, melancholia, dementia, etc.)
2 Epileptics.
4 Paralytics.
2 Deaf-mutes.
3 Blind (congenital?)
2 With defective vision.
3 Deformed (spinal curvature, etc.).
6 Lame (character of lameness not given).
1 Rachitic.
22 Phthisical, scrofulous, or manifestly of weak constitution.

My notes show 146 as the total number of children born of these 45 unions, but I think it improbable that this is correct, as several of the marriages were very prolific, and as I have reason to think that in some cases my information related only to the defective.

Nothing would more certainly be unsound than deductions from these figures. Without intention, they are actually selected cases, and it would be a pure accident if they were found to embody *the rule*. I am certain that I could easily find in Scotland 45 marriages, where no kinship existed, which would exhibit in the offspring even a sadder picture. Though it is

just possible that in the particular instances before us the unsound condition of the children was largely due to the consanguinity of their parents, yet it is quite certain that from such data alone we cannot correctly determine the measure of the evil influence which such consanguinity exercises on the average. By a selection of cases a false power might, in like manner, be given to any of the other causes of such calamities. There, however, the selection would be forced, *and the forcing apparent;* while here it is natural, unacknowledged, and undesignedly made, but not the less real on that account.

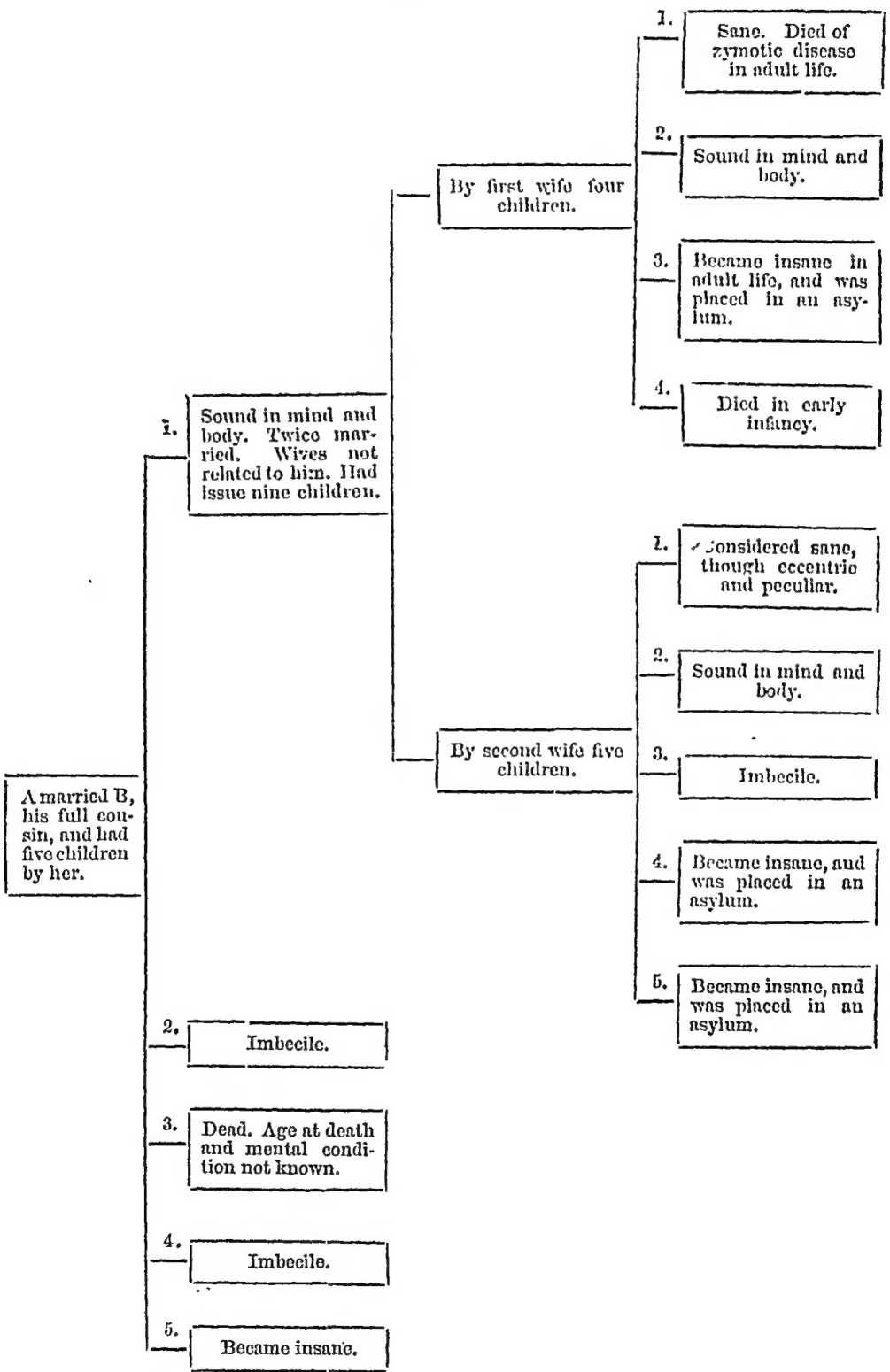
There is another kind of evidence which has been largely used in discussions on this subject, and which is somewhat allied to that of which I have been speaking, though even more likely than it to lead to error. Startling illustrations of calamitous sequences to cousin-marriages have been detailed, and pointed at with a finger of warning, *the relation of cause and effect being assumed.* Such a *relation* may have existed, but it is equally possible that it may not, for it must always be remembered that a blood-alliance between the parents is far from being *the only cause* of defective offspring.

Supposing the proof complete that it is *a cause,* it is still only one of many, and we cannot therefore point with confidence to a particular case, and say positively, that the calamity there is due to consanguinity of parentage, for it may really be due to injuries in parturition, to hooping-cough, to a blow on the head, or to starvation in infancy. Consanguinity in the parents *may* very decidedly *tend* to injure the offspring, yet it by no means follows that every defect in the children born of blood-related parents is an expression of this tendency, for the general causes of defect will exist among them as among other children, and will give results at least equally disastrous. It is clear, therefore, that isolated cases cannot be used in this or in any similar question to indicate the measure of the evil which may be expected, or even *to prove its existence.* The minute examination of individual cases is far from valueless, but they cannot be adduced to teach the rule in this matter.

In the 45 cases already alluded to, there occur some of as startling a character, I think, as any which I have ever seen recorded. It would be difficult, for instance, to imagine a

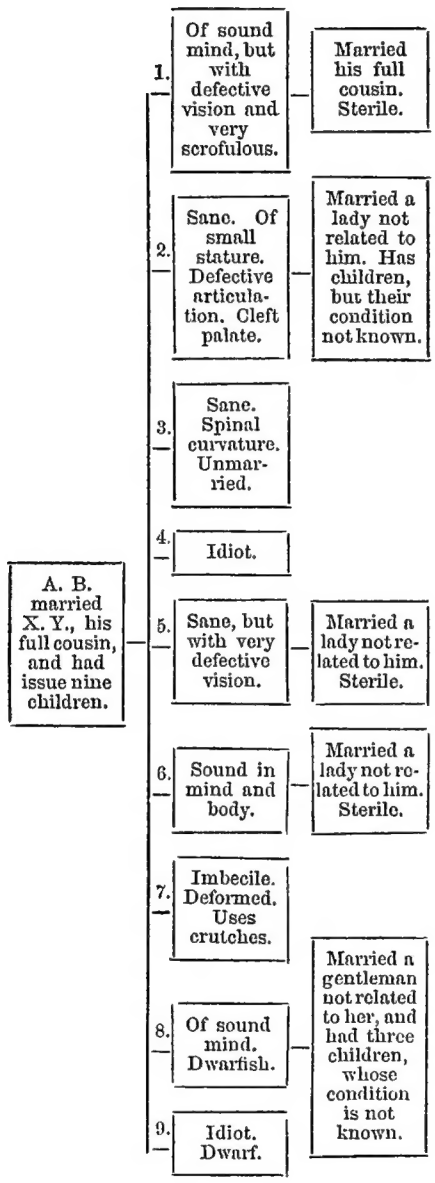
greater intensification of one form of mischief than occurs in the following case, which I represent diagrammatically in order to make it more easily understood :—

CASE I.

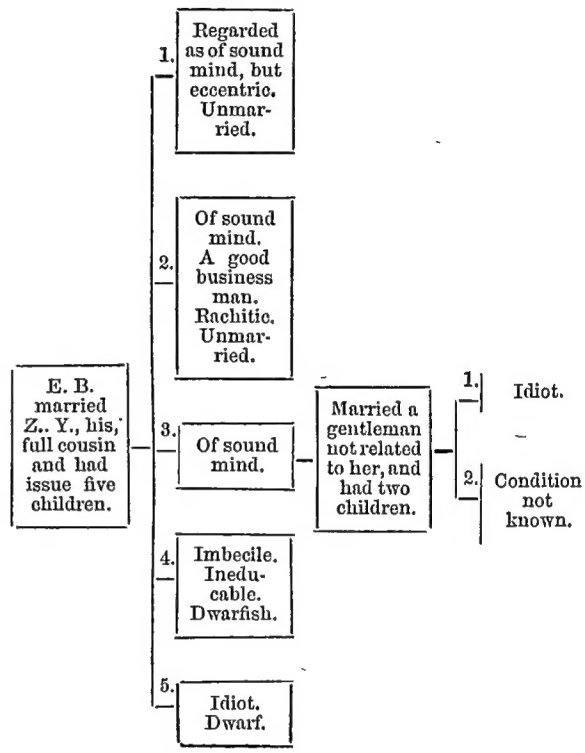


If it be possible to conceive a family history more melancholy than that presented in the foregoing diagram, we shall find it in the cases which follow.

Case II.



Case III.



As differing somewhat from the foregoing, but still revealing a great amount of family misfortune, I subjoin the history of other two unions of consanguinity.

CASE IV.—M. married F., his cousin, and had issue five children, of whom one was sane, one was paralytic, one was lame, and two were idiotic.

CASE V.—M. married F., his cousin, and had issue ten children, of whom two were sane and had arrived at maturity, one was an idiot, one was an imbecile, one was deaf and dumb, and five died in early infancy.

When I resolved to attempt the investigation of this subject, I felt a perfect indifference as to whether I should be led to the conclusion that a blood-relationship between the parents did *much*, or *little*, or *no* injury to the offspring, and I have endeavoured to conduct the inquiry without prejudice. The result is, that I have convinced myself that it does injure the offspring, and I shall by-and-by detail, as fairly and fully as I can, all the facts on which this conviction is founded. My object in now stating the general conclusion at which I have arrived is to enable me to make the foregoing cases the text of some comments, the introduction of which at this stage of my paper will be convenient. Besides, it does not appear to me that it would serve any good purpose to avoid the indication of this conclusion till after the facts are stated on which it rests.

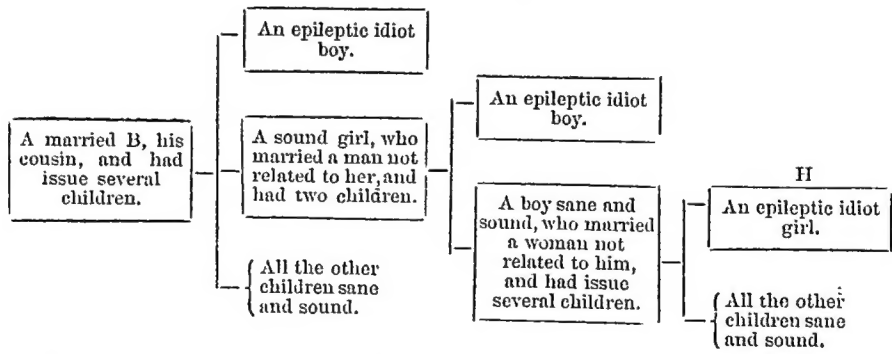
I have said already, that it would be unphilosophical to found a belief even in the existence of an evil done to children by a blood-relationship between their parents on such evidence as the detail of a few startling cases like the five which precede, and that it would be still more unphilosophical to look to such evidence for the teaching of a rule in the question. For, in actual fact, we know that however viewed, these are most exceptional cases; and, what is more, we also know that it would be easy to set off against them cases quite as deplorable in their character, where the most careful inquiry has failed in detecting any kinship among the progenitors of the defective children for generations back.

Yet, this minute examination of individual cases has its use. For instance, it leads us to suspect that the evil may sometimes not manifest itself in the immediate offspring of such unions, yet may do so in the grandchildren and great-grandchildren. Cases I, II, and III, all appear to show this, and it has been

observed in scores of other instances. Sometimes, indeed, a defect has been found to occur, which at first sight appeared purely due to hereditary transmission, or to be without explanation in the history of the ascendants, yet which, on a close investigation presented itself as the possible transmission or manifestation of an evil which had originated remotely in a union of kinship. There is thus reason to suspect that in the seemingly sound children of blood-related parents a *potential* defect may exist and may eventually manifest itself as *actual* defect in their offspring. If this be real, we are led to the inference, that even the most careful estimate of the measure of the evil under examination may prove erroneous, since defects originating in these marriages may appear eventually in society as hereditary tendencies, and it may scarcely be possible, in a particular instance, to speak otherwise of the defect than as a manifestation of an inherited proclivity.

The following case, perhaps, better illustrates these remarks than those I have already given. I must beg, however, that it be remembered that it is given merely in illustration, and not as proof. Absolute, stateable, proof of such views can scarcely be given, yet they may be fair and sound conclusions from actual observation in a wide field—of such probable accuracy, at least, as to make it prudent in us to shape our conduct by them.

CASE VI.



The parents of the epileptic idiot girl H were not blood-related, nor were her grandparents, but her great-grandparents were cousins, and in their children, grandchildren, and great-grandchildren, epilepsy had appeared, though it had never done so in any of the collateral branches of their family.

It occurs to me here to remark, that a single form of defect often occurs either in one generation, or in successive generations. This form may be epileptic idiocy, as in the last case, or uncomplicated mental disease, as in Case I, or deaf-mutism, blindness, deformity, club-foot, hare-lip, etc., as in many other cases which have come under observation, but which it would be impossible here to detail. Cases II, III, and IV, on the other hand, illustrate the combination of mental and physical defects, and afford an interesting manifestation of sterility. It is, of course, more usual to have these mixed results, than to find the defect confined to one form. In Case V we have idiocy, imbecility, deaf-dumbness, and lameness, combined with a large infant mortality. With regard to this last, there is a very general belief among the common people of Scotland, that the children of cousins are weakly, and of low viability, and my notes contain numerous cases which would support this. For instance, I have recorded of one cousin-union that there were ten children, of whom five died in early infancy. I saw all the survivors, and regarded them as sound and healthy; so that nothing but a tendency to defective viability appeared to manifest itself in the offspring in this case, though, of course, it is possible that among those who perished so early there may have been defects both of mind and body which were not recognised.

Cases in which two brothers have married two sisters, their cousins, are not uncommon; and, it has been said, that certain families appear to exhibit a tendency to cousin-marriages. From this it has been suspected that there may exist in such persons some exceptional character or condition which is passed on directly to their children, and that thus it may be a mistake to speak of defects among these latter as due to the *kinship* between their parents. In many cases, however, it would scarcely be a mistake so to speak of them; for, admitting the existence of some such family peculiarity as that spoken of, there could be no better way of securing its intensification than by effecting unions between cousins, *both of whom* would probably possess it, and who would thus run the risk of transmitting it to their children in a form so exaggerated as to be

positive disease or defect there, though it might have been little other than a peculiarity, or, perhaps, an agreeable eccentricity, in themselves. If it be granted that such marriages tend thus to exaggerate such peculiarities, nothing more is asked, for nothing more is necessary to show that *they do harm.* The practical question is this,—should they or should they not be avoided? and the answer we are led to give is that they should, for the reason that they tend to injure the offspring. It matters not, practically, whether the injurious influence is the result of some mysterious effect, intrinsic in the *consanguinity* itself, or merely the result of this, that consanguinity increases the risks of finding undesirable or morbid peculiarities transmitted from parents to children in an intensified and dangerous form. If the results are disastrous, they will not be less so on one theory than on another, and the lesson will be the same. If relations by blood are liable to possess the same morbid tendencies, and if, by pairing among themselves for procreation, they are likely to transmit these tendencies in a dangerously increased form to their children, then it is surely their duty to avoid such unions, and to seek among strangers alliances with individuals *more likely* to possess qualities calculated to modify or counteract the morbid predispositions in question. It may be that there is absolutely nothing whatever in the bare fact of consanguinity, and that a marriage of kinship should be avoided on the same grounds as a marriage between any man and woman *both* predisposed say to insanity. In the case of cousins, though there may be nothing common to them of so marked a character as a declared tendency to insanity, still there may be common to them any one of a hundred transmissible peculiarities, which it would be very undesirable to send down to their children in an exaggerated form. Even a strong temperament common to both might thus be intensified into disease in their offspring. It follows, therefore,—as the chances of possessing similar peculiarities are great among relatives, and as intermarriage tends to give a dangerous strength to these in the offspring,—that to avoid such risks the prudent will avoid such unions as appear to increase them.

Families and knots of the community among whom marriages of kinship prevail may be found to be so circumstanced otherwise as to favour the development of unhealthy peculiarities, but if blood-marriages are in practice found to strengthen these peculiarities in the generations which succeed each other, then they do harm and should be discouraged, whether the mere fact of consanguinity has anything to do with the result or not. This remains an open question, though, I think, many will be ready to go the length of admitting that—Given a man and woman not cousins both predisposed say to x, and a man and woman similarly predisposed who are cousins, the chances of transmitting x to the offspring will be greater in the last case than in the first; in other words, that the kinship will not be altogether silent.

If the general views just expressed be correct, it follows as possible that in a particular case the relationship of the parents may do no injury to the offspring. In other words, children of as great perfection may be born of parents who are cousins as of parents who are not. A man may nowhere find a better wife than in one related to him by blood—better I mean for his offspring. Facts, I think, bear this out, and the explanation lies in this, that there may be full cousinship of blood without much cousinship of quality. The two things do not *necessarily* go together; so that a man may possibly find in his own relative the very qualities best fitted to tone down or neutralise in his children those strong transmissible peculiarities in himself, which it would be undesirable to have exaggerated in them —exaggerated perhaps into acknowledged defect or disease.

But while all this is possible (and I believe it to be true of several cases well known to myself), it must be remembered that the chances are the other way; and for this reason unions of kinship should be avoided. When we deal with large numbers, I think it can be proved that this is the safer and more prudent course, and the best for society.

It by no means follows from what I have said that a man should desire in the mother of his children only qualities opposed to those which he himself manifests. There is a *beatissimum medium* in this matter as in all others. In point of fact

it is often to a slight intensification in the offspring of certain qualities of body or mind, possessed equally by both parents, that we owe those salient physical or mental characteristics which impart a power of achieving great things. In a later part of my paper I shall have more to say on this point. In the meantime I shall proceed to detail and examine those facts on which I rest my conclusion, that consanguinity of parentage does tend to injure the offspring. The views I have briefly propounded as to the *modus operandi* may be sound or not, but the facts remain, and the inference I have drawn from them appears to be fair and well founded.

I have already stated that, in order to be able to determine the existence and measure of an evil resulting to children from consanguinity in their parents, it is necessary that we should have evidence of a more satisfactory character than any to which reference has yet been made. In the detail of startling cases, or in the grouping of cases furnished from the memory of the collector and from that of his friends, we do not obtain evidence which is likely to lead us to sound conclusions. We must, therefore, turn to some other mode of investigation for a supply of data from which we can draw inferences with greater security and confidence. It appears to me that the following line of inquiry is calculated to meet this demand.

1. Take a large number of instances of any defect which kinship in marriage is alleged to cause in the offspring, and ascertain how many are the issue of parents related to each other by blood, and how many of parents are not so related. Either the number must be so large as to preclude the possibility of selection in any form, or it must include as nearly as possible *all* instances of the defect which occur in the section of the community from which they are drawn; but in any case the number should not be small.

The results must then be compared with the proportion of cousin marriages to other marriages in the same community.

Unsoundness of mind is believed to be one of the defects in question, and I accordingly embraced the opportunities afforded by my position for ascertaining with accuracy and precision the history of the parentage of all insane, idiotic, or imbecile persons in a particular district of the country.

Deaf-mutism is generally received as another of these defects, and I have endeavoured to find out what proportion of the deaf-and-dumb in this country are the children of blood-related parents.

After giving the results of these inquiries, I shall briefly state those of similar investigations in other countries.

2. The second mode of investigation consists in taking certain localities and collecting the family history of every marriage among the people there, and then comparing the results of those in which a kinship existed with the results of those in which it did not exist. The falsifying effects of unintentional selection are reduced to a minimum in this line of inquiry, which, if carried out on a large scale, would lead us more certainly to the truth in this matter than any other. But in that case, it would require to embrace a field so wide as to make it nearly impossible for any private individual to undertake the inquiry.*

I have succeeded in doing a little, and that little appears to me to have value, though not such a value as I hoped would be the case. I was prepared to encounter difficulties and disappointments, but I did not expect them to be quite so great as they turned out to be.

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* The question under discussion in this paper has been regarded as one of such interest and importance in France, that last year the following letter was addressed to the various Prefects by the Minister of Agriculture, Commerce, and Public Works:—"Sir,—The question so warmly debated in learned bodies as to the influence of marriages of consanguinity upon the physical aptitudes of the generations which are the result of these, gives quite a special importance to the table which the annual movement of the population should furnish me with respect to the number of marriages. Now, information derived from trustworthy sources authorises me to believe that these indications are remarkably incomplete as regards marriages between cousins-german. Omissions of this kind are very easily explained when we bear in mind that the marriages in question not being, as are those contracted between brothers-in-law and sisters-in-law, uncles and nieces, aunts and nephews, the object of legal prohibition, the local authorities have no regular means of recognising them. I beg of you, then, to issue special instructions inviting the mayors to make direct inquiries in the case of all future marriages, when the papers laid before them do not contain the necessary information whether the parties are related in the degree of cousins-german or even of cousins the issue of cousins-german." —*From the Medical Times and Gazette.*

After personally visiting and examining the places chosen (when that was possible), I placed a schedule of queries in the hands of willing and competent persons. These queries were numerous and comprehensive, and I aimed at much more than in any case I have accomplished. In many instances the deficiency is such as to make the whole useless, and my labour is lost. Regarding other places, however, I have received much accurate, interesting, and valuable information.

On examining the results I find each place so isolated and separate from the others by individual characteristics as to make grouping or even close comparisons impossible. I shall, therefore, be obliged to state the results of each inquiry in detail, endeavouring to give only what appears to be relevant to my subject. In doing this it is possible that what I have regarded as relevant some may regard as irrelevant matter, but I think it fairer and safer to run the risk of this charge, rather than mislead by omission.

Having given this general description of the mode of investigation I have proposed to myself, I shall now proceed to state the results, and I have first to show what my inquiries have disclosed as to the connexion between unions of kinship and the actual idiocy and deaf-dumbness of our country.

The number of Idiots and Imbeciles in nine of the Counties of Scotland who are the Offspring of Unions of Consanguinity.

Ever since 1858, when visiting those lunatics in Scotland who live in private dwellings, the relationship of the parents has been a thing generally inquired into. It was not, however, invariably done, and when difficulties occurred, as frequently happened, about obtaining definite information, no serious effort was made to overcome these. In nine counties, however, visited during part of 1860 and 1861, I made careful inquiry *in every case,* exerting myself to the utmost to obtain the information desired. Notwithstanding this I often failed. Sometimes where the information was possessed, it was not given; but much more frequently it was not given, because not possessed. At times the great age of the patient explained this; at other times he had been born in a different part of

the country, or even in England or Ireland, and both parents had long been dead; at times, again, neither of the idiot's parents was known to his guardians, or one might be well known, and nothing known of the other. It must be remembered that the idiot himself could in no case be my informant.

The counties to which I have referred were Aberdeen, Bute, Clackmannan, Fife, Kincardine, Kinross, Perth, Ross and Cromarty, and Wigtown. They represent a population of 716,210, and embrace 299 parishes, and form a considerable proportion of Scotland. The result of my investigation is as follows:—

The whole number of idiots examined was 711, including those in receipt as well as those not in receipt of parochial aid. Of these, 421 were ascertained to be the children of parents not related by blood, and 98 were the offspring of parents between whom there was a more or less close kinship. In 84 instances the relationship was not known, and 108 of the whole number were born out of wedlock. In a tabular form the results stand thus:—

(1.)	Whole number of idiots and imbeciles examined - -		711
(2.)	Of these—illegitimate - - - - - -	108	
	... parentage not known - - - - -	84	
			192
(3.)	Total number whose parentage was known - - -		519
	Of these—parents not related - - - -	421	
	... parents related - - - - -	98	
			519

Taking the whole number of idiots examined, including both the illegitimate and those of whose parentage I could learn nothing, we have 13·6 per cent. of the entire number born of parents between whom there was a blood-relationship. In order therefore to believe that such relationship does not influence the amount of idiocy, marriages of kinship would require in these counties to be to other marriages in the ratio of 1 to 7, which they notoriously are not, though unfortunately no facts exist to show precisely their relative frequency. I think, however, that it may be regarded as certain that such a ratio is about ten times higher than the reality.

But in order properly to test this influence of consanguinity,

we must at least deduct the cases of whose parentage I could obtain no information. Those acquainted with the difficulties of such investigations will admit that the number of these is not great. This deduction then being made (711—84 = 627), the proportion rises at once to 15·6 per cent. This last may be regarded as referring to the whole community, since there is no reason for supposing that among the 84 of whose parentage nothing was ascertained a greatly different proportion would be found to be the offspring of blood alliances.

It may appear to some that a further deduction should be made. The paternity of the illegitimate is practically an unknown thing, and I have elsewhere shown that illegitimacy itself tends to produce defective children. The illegitimate idiots should, therefore, be deducted, *so that those idiots born in marriage of parents related by blood may be compared with those born in marriage of parents not so related.* If this be done it will be found that the former constitute 18·9 per cent. of the latter. Instead, therefore, of every seventh or eighth marriage in the community, we should require every fifth or sixth, to be between persons related by blood to each other, in order to show that consanguinity of parentage does not influence the amount of idiocy.

Of the 98 idiots whose parents were related, the degree of relationship was as follows :—

Cousins in - - - -	42 cases.
Second cousins in - - -	35 ,,
Third cousins in - - -	21 ,,
	98 cases.

It is probable that more second and third cousins intermarry than cousins, yet these last produce a larger number of idiots. The closer, in short, that the alliance is, the greater appears to be the danger. This, at least, is the teaching of the statement just made.

During the course of these investigations, 64 cases came to my knowledge in which more than one idiot existed in the family. In all of these but 5, I obtained the history of the parents. In the remaining 59, no less than 26 instances of blood-relationship occurred, or 44 per cent. This is an in-

structive fact, showing that when we select cases in which the tendency to idiocy appears with force, then kinship of parentage also presents itself with a marked increase of frequency. Thus, while it appears that in nearly 1 out of every 2 cases in which more than one idiot occurs in a family, consanguinity of parentage is found; in those cases, on the other hand, where only one idiot occurs, such relationship only exists in 1 out of 5 or 6 cases. The exact results of this part of the inquiry I give below.

1st.—Of Parents Related.

Degree of Relationship.

12 Cases with 2 idiot children.	5 Cousins - - -	giving	24	idiot children.
	6 Second cousins - - -			
	1 Third cousins - -			
10 Cases with 3	8 Cousins - - -	„	30	„
	1 Second cousins - - -			
	1 Third cousins - -			
2 Cases with 4	0 Cousins - - -	„	8	„
	1 Second cousins - - -			
	1 Third cousins - -			
1 Case with 5	1 Third cousins - - -	„	5	„
1 Case with 7	1 Third cousins - - -	„	7	„
26			74	

2nd.—Of Parents not Related.

24 Cases with 2 idiot children, giving	- -	48	idiots.
8 Cases with 3 „ „	- -	24	„
1 Case with 4 „ „	- -	4	„
33		76	

The whole 59 cases, therefore, give 150 idiotic children, but 26 of them give 74 of the whole, or within two of the number yielded by the 33 cases where no relationship existed, affording still another evidence that unions of kinship influence the amount of idiocy in our country.

The counties of Ross and Wigtown present peculiarities, an examination of which may throw some further light on the subject under discussion. I shall therefore detail more minutely the results of my investigation into these districts, of which a summary is exhibited in the following table* :—

* The under part of the table is a continuation of the upper.

COUNTIES.	Total cases examined or reported on.	Number included in column A who were Idiots or Imbeciles.	Number included in column A who laboured under Acquired Insanity.	Number included in column A about whose parentage information could not be obtained.
	A	B	C	D
Ross and Cromarty.	189	146	43	68
Wigtown	71	60	11	15
Totals.....	260	206	54	83

No. of cases included in A, about whose parentage information was obtained.	No. included in E who were Idiots or Imbeciles.	No. included in E who laboured under Acquired Insanity.	No. of Idiots or Imbeciles (F) between whose parents there was a Blood-relationship.	No. of those labouring under Acquired Insanity(G) between whose parents there was a Blood-relationship.	Total No. between whose parents there was a Blood-relationship,
E	F	G	H	I	K
121	91	30	32	3	35
56	47	9	5	1	6
177	138	39	37	4	41

It appears, therefore, that of 177 insane persons, about whom reliable information was obtained, in 41 cases a blood-relationship within the degrees of first, second, or third cousins, was determined. This represents about 23 per cent.

Even if we take the whole number examined or reported on, and include the 83 about whom no information as to parentage is possessed, we shall have out of 260 cases 41 the offspring of relatives. This would represent about 16 per cent.

On either supposition, the influence of consanguine marriages in increasing the amount of unsoundness of mind is clear.

On referring to column H it will be seen that of the 41 cases who were the offspring of blood-related parents, 37 were idiots or imbeciles.

Of this class of the insane there is always a considerable proportion whose disease is not truly congenital, having its origin in the early period of extra-uterine life. Among those idiots or imbeciles, however, who are born of related parents, the proportion of this non-congenital idiocy I have found to be smaller than in the general class of idiots. In other words,

given one hundred idiots the children of parents related, and another hundred the children of parents not related, it will be found I think that a larger proportion of the former are due to fœtal disturbances than of the latter.

Further, we find that proportionally a larger number of idiots and imbeciles are the children of related parents, than of maniacs, melancholics, etc., or of those labouring under that which, for convenience, I have called acquired insanity. If we take the whole number of idiots examined, 18 per cent. are children of related parents. If, again, we take the whole number of cases of acquired insanity the proportion falls to 7·4 per cent. But if we deal only with those of whose parentage we have information, then in the one case it is no less than 27 in the 100, and in the other 10 in the 100. From this it would appear that the amount of idiocy and imbecility is influenced by these unions to a greater extent than is the amount of the acquired forms of insanity.

It seems scarcely necessary to point out when such a statement is made as that 13 or 15 per cent. of all the idiots in the districts examined were the children of blood-related parents, that it by no means follows that the whole of that percentage is due to the consanguinity of parentage. Indeed, it is quite certain that it is greatly otherwise. All the other causes of idiocy will operate among the offspring of cousins as they do among the offspring of persons not so related; and it must always be remembered that these causes are very numerous and very varied. The idiocy of our country is not due to one but to a great many things, each of which contributes its share to make up the whole: one cause may be more powerful than another, but each influences the total amount. The facts which have been detailed render it very probable, if they do not *prove*, that a blood alliance between parents is one of these causes—influencing unfavourably the amount of idiocy in the land, but they do not exhibit definitely the measure of this influence, though they may and do aid us in estimating it.*

* There are many causes of idiocy which are undoubtedly of greater power than kinship of parentage. Hooping-cough, scarlatina, and measles, for instance, produce a large amount of the idiocy of Scotland, as they do

The official reports to the governments of Massachusetts and Connecticut, on the amount and condition of idiocy in those states, exhibit a line of inquiry somewhat similar to that with which we are now dealing. The facts elicited by these investigations are briefly as follows:—

In 1846, commissioners were appointed under an act of the legislature of Massachusetts "to inquire into the condition of the idiots of the commonwealth, to ascertain their number, and whether anything can be done in their behalf." The report was prepared by the well-known Dr. Howe.

Of 574 idiots, with whom this report deals, the parentage was ascertained in 359 cases, and of these 17 were known to be the children of parents nearly related by blood. From collateral evidence it was concluded that at least 3 more cases should be added to the 17. This would show that more than one-twentieth (or about 5 per cent.) of the idiots examined were the offspring of the marriage of relations. Dr. Howe says:

"The statistics of the 17 families, the heads of which, being blood-relatives, intermarried, tell a fearful tale.

"Most of the parents were intemperate or scrofulous; some were both the one and the other; and, of course, there were other causes to increase the chances of infirm offspring, besides that of the intermarriage. There were born unto them 95 children, of whom 44 were idiotic, 12 others were scrofulous and puny, 1 was deaf, and 1 was a dwarf! In some cases all the children were either idiotic, or very scrofulous and puny. In one family of 8 children 5 were idiotic."

All the 17 cases referred to appear to have been cases of true congenital idiocy.

Again, in the report of the commissioners on idiocy to the General Assembly of Connecticut, in 1856, we find that 310 out of 531 cases reported an "adequate cause." Of these causes,

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probably of other countries. Hooping cough, in particular, is often followed by imbecility or idiocy. We are too apt to think of idiocy as a congenital condition. In point of fact, however, a large proportion of the idiocy of the country has an extra-uterine origin, and, strictly speaking, is acquired and not congenital.

consanguinity of parents was considered the probable one in 20 cases, or nearly 7 per cent.

On examining the results of the inquiry, however, we find that the question—"Were the parents of the idiot related by blood?" was only answered in 160 cases,—in 140 negatively, and in 20 affirmatively. Of these idiots, therefore, the relationship of whose parents was ascertained, 12½ per cent. were the offspring of consanguineous marriages.

Of the parents of the 20 the degree of relationship was as follows:—

Own cousins - - - -	12
Second cousins - - - -	3
Third cousins - - - -	1
Double cousins - - - -	3
Great-grandparents' own cousins - -	1
	20

Deaf-mutism in Connexion with Consanguineous Marriages.

Deaf-mutism is another of those defects which kinship of parentage is alleged to produce in the offspring; and we shall now endeavour to show how many of the deaf-mutes in this country are the issue of parents related to each other by blood, and how many of parents not so related.

The writer of an able article on the Vital Statistics of the Deaf and Dumb, in Knight's Cyclopædia, says, that, next to hereditary transmission, consanguine marriages are the most fertile source of deafness. "Every institution in the kingdom," he adds, "bears witness to this fact, in the numerous cases of pupils who are the offspring of first cousins."

Mr. Burton, of the Liverpool Institution for the Deaf and Dumb, in a paper published in the Medico-Chirurgical Journal of that city (Jan. 1859), says—"In an inquiry which I made some time ago, from a large number of persons, I found that about every tenth case of deafness resulted from the marriage of cousins."

Dr. Peet, the well-known Principal of the New York Institution, "gives it as his impression, that there is one such case, on an average, out of about every ten congenital cases, in which the inquiry has been made;" and he estimates that there is in

that part of the United States hardly one family in fifty of which the parents were first or second cousins; so that, if, in the general population, there be 1 child congenitally deaf in 3600 born, there would be 1 in 700 of the children of cousins, or five times as many.

Regarding Ireland, we have some valuable facts, to which I shall presently allude, illustrating the extent of this cause of deaf-dumbness; but as regards America, much as it has added to the literature of deaf-mutism, and few countries have done more, on this point we have nothing but *impressions*, and I have searched in vain for *facts*. Not more successfully have I searched for such facts in the reports of our own institutions. Many of these are documents of the highest interest, and full of precise and well-arranged information; yet on this particular point we have little beyond the general expression of a strong opinion that such marriages are a fruitful cause of this calamity.

Under these circumstances, I resolved to write to the Superintendents of the sixteen institutions in Great Britain, requesting information as to the number of pupils under tuition who were the children of blood-related parents. I have to thank all of these gentlemen for a ready and courteous reply. In six of the sixteen cases, however, it was found impossible to give the information I desired. The state of matters, in the remaining ten is represented in the table below.

	1.	2.	3.	4.
	No. of Pupils in Institutions.	No. of Families represented.	No. of Pupils the offspring of consanguine marriages.	No. of Families represented.
I. *Scotch Institutions*:— Glasgow, Dundee, Aberdeen, Donaldson's Hospital	201	181	12	9
II. *English Institutions*:— Bath, Newcastle-on-Tyne, Swansea, Exeter, Doncaster, Brighton	343	323	16	15
Total.....	544	504	28	24

From the total number of pupils we must deduct 25 per cent.

for acquired deaf-dumbness—a form over which consanguine marriages have but a small influence. This represents the average proportion of acquired deaf-mutism for Great Britain, and is far below that for the United States, which is 42 per cent., and that for Germany, which is 52 per cent.

This deduction being made both from columns 1 and 3, out of 408 deaf-mutes, we have 21 whose parents were blood-relations, or 1 in 20, which is considerably below the estimate arrived at by Mr. Burton and Dr. Peet.

If cousin-marriages, however, have no influence in the production of this result, then such unions, in the general community, ought to be to others in the proportion of 1 to 17. I have no figures to show that this is not the case, nor can I obtain them; but I believe all will at once agree with me in considering such a proportion as far too great. The average for Great Britain is probably not more than 1 to 60 or 70.

It will be observed that the 24 cousin-marriages yielded 28 deaf-mutes. Had the same proportion existed through the entire number of pupils, they ought to have been represented by 466 instead of 504 families. There is therefore a greater frequency of two defective members in one family when dealing with the offspring of blood-relations than when dealing with others. In the Irish returns (1851) this is still more evident. 154 cousin-marriages, in which deaf-mutism occurred, yielded no less than 235 mute members.

Dr. Peet, in his thirty-fifth annual report, in analysing Wilde's "Statics of Disease," says, that it appears that "of the Irish deaf and dumb, from birth, about 1 in 16 were the offspring of parents who were related within the degrees of first, second, or third cousins."* This does not differ greatly from the estimate which I have formed for Great Britain. Supposing cousin-marriages to be to others as 1 to 70, it will follow, Dr. Peet says, that congenital deafness appears at least four times, perhaps five times, as often from a marriage between cousins as from a marriage between persons not related.

* I have myself examined Wilde's report, and have some difficulty in seeing how Dr. Peet obtains these figures.

Of the 235 deaf-mutes in Ireland who were the offspring of cousins, only 7 were cases of acquired deafness. This is greatly below the proportion in the deaf-mute population of all Ireland, which shows 11 per cent.* of acquired deafness and 7 per cent. uncertain. Instead of 7, therefore, there should have been 26 cases of acquired deafness. In other words, deaf-mutism, as it appears among the children of cousins, seems to be to a larger extent congenital than when it appears among the children of persons not related to each other by blood.

We now come to the second mode of investigating this question, which consists in taking certain localities, and collecting the family history of every marriage among the people there, and then comparing those in which a kinship existed with those in which it did not exist.

I have already pointed out the difficulties and disappointments which I encountered in conducting this line of inquiry, and I have also shown that it will be necessary to deal with each locality separately—groupings and comparisons being impossible. This mode of giving the information which I have obtained will, I think, best show the truth of the matter. I shall give it in full, even though some of the details may appear irrelevant or opposed to my conclusions, believing this to be the fairer and safer course.

St. Kilda.

Early in June 1860, I sent a list of queries relating to the people of this island to Mr. M'Raild, the factor, who makes a long annual visit to it. Having reason, however, to fear that he had left the mainland before the arrival of my letter, and understanding that Captain Otter, in the course of his survey of the Western Islands, would probably go to St. Kilda, I transmitted a similar set of queries to him, with the request that he would obtain answers through Mr. Kennedy the schoolmaster and catechist. From both sources I have fortunately

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* This again is greatly below that for Scotland, England, America, or any of the countries on the continent of Europe.

received replies to my communications, and these agree in all important respects. I am further indebted to Captain Thomas, who also visited the island in the summer of 1860, for much valuable information.

The population consists of 78 persons—33 males and 45 females. Of these only 4 are below the age of five, 6 between the ages of five and ten, 9 between ten and fifteen, 13 between fifteen and twenty, 12 between twenty and thirty, 9 between thirty and forty, 12 between forty and fifty, 11 between fifty and sixty, 1 between sixty and seventy, and 1 between seventy and eighty. At the census of 1851, the population consisted of 110 persons, with that great preponderance of females which still exists—a preponderance which, then as now, showed itself chiefly below the age of twenty. Above that age the difference is but slight. Forty years ago, Macculloch found exactly 103 individuals in 20 families; while Martin, 160 years ago, found 180 persons in 27 families. As regards my present inquiry it is of importance to find that the population is a diminishing, and not an increasing one.

There are 14 married couples on the island, being a fall from 19 at the census of 1851.

In not one of these couples is the relationship between husband and wife that of full cousins. Having in mind the small number of the people and their complete isolation, this fact surprised me, and differed much from what I expected.

Not less than 5, however, of the 14 are marriages between second cousins. Of these five couples 54 children have been born, of whom 37 died in early infancy, leaving 17 alive. Those who perished, passed away at an age to be reckoned only in days, and of them nothing can be told. But of the 17 survivors it is distinctly stated that *not one* is either insane, imbecile, idiotic, blind, deaf, cripple, deformed, or in any way defective in body or mind.

With regard to the rest of the population, only one insane person was found on the island, viz., C. M'L., who is described as upwards of fifty years of age, and of weak mind. As to her parentage, the schoolmaster was not able to give any information to Captain Otter, who kindly made inquiries at my request.

At the date of his last visit she had left St. Kilda, and was residing in Harris.

In addition to this woman, I am informed that one or two others are "*slightly silly;*" but, on inquiry, it appears that these are cases rather of bodily than of mental weakness, the result, it is said, of accidents on the cliffs. They are young persons, however, and Mr. Kennedy states that, when under his care at school, he considered them "dull, but not silly or wrong in mind."

These particulars show the efforts which I made to arrive at a knowledge of the exact state of the case, and not to overlook those instances of slight defect which, in a backward community, are apt to pass unnoticed. "It is certainly strange," as Captain Otter remarks, "that though they marry so much amongst themselves, there is only one—a spinster—who is weak in intellect." Even this, of course, being 1 in 79, is far above the average for Scotland; but still it does not realise the disastrous results which one would expect to find in a community where more than one-third of all the married couples are related by blood,—even though this relationship is one removed a degree beyond that of full cousinship.

Among the queries which I transmitted, was one asking whether it was generally thought by the people of the island that a blood-relationship between the parents is injurious to the mental or bodily health of the offspring. The answer to this is, that no such opinion is commonly entertained. Martin, however, states that it was otherwise in his time, and that such unions were then condemned. From the fact that no marriage between full cousins exists among them, it is not improbable that the opinion may still operate, as far as is possible in a community so peculiarly placed.

Where the whole number of the people is so small, one or two strangers occasionally settling among them would, practically, be a large introduction of new blood. I, therefore, directed another query to this point, and I learn that of the 28 married persons in the island, who, with their offspring, represent within 4 or 5 of the entire population, there is "only one who does not belong to it, who has been imported,

and who is not in the full sense a St. Kildian." This person is a woman from Lochinver, who married a native, and who had 14 children, of whom only two live—both unmarried. The common opinion that a stranger very rarely settles in the island appears, therefore, to be correct. At the census of 1851, every person found on the island was born there, except one woman who had come from Sutherland as the wife of a St. Kildian. This is the same woman who is still found to be the only stranger. None of her offspring are among the married couples. I am informed that the children of a father or mother, not native, are always the most ready to quit the island,—a natural result, but one by which the benefit of an introduction of new blood is lost to the general community.

The physical condition of the people appears to be good. Captain Otter says, "that when they pass the first fourteen days they grow up robust, healthy, and particularly clean in skin." Captain Thomas describes them as well-made, well-fleshed, good-looking, and smooth-skinned. He found many more fair than dark, the large majority presenting the Norse type. Macculloch says, "The men were well-looking, and appeared, as they indeed are, well fed; exceeding in this, as in their dress, their neighbours of the Long Island." All those who have had opportunities of comparing the condition of the St. Kildians with that of the Lewis people, those of Barvas and Shader in particular, seem willing to endorse Macculloch's opinion.*

Mentally, the St. Kildians are described as intelligent, sharp, cautious, sober, and moral.

In the course of these remarks I have made mention of persons having large families, of whom only two or three remain alive. This, unfortunately, is not the exception, but the rule;

* The backwardness in both islands, however, is excessive; and it has to be observed that it is a condition of backwardness even more than one of poverty. A gentleman, who had seen both places, writes of Lewis, that "it would be difficult to imagine anything more primitive, except nudity and raw food;" while in the "Census of Great Britain in 1851, published by authority of the Registrar-General," the dwellings of St. Kilda are spoken of as "dirtier than the dens of wild animals."

and I have now to draw attention to a very dark spot in the vital statistics of St. Kilda. viz., the infant mortality, which is enormous. The cause of this is an affection now happily unknown, or all but unknown, to the rest of our country, viz., trismus nascentium.

Out of 125 children, the offspring of the 14 married couples residing presently on the island, no less than 84 died within the first fourteen days of life; or, in other words, 67·2 per cent. This exceeds the mortality from the same cause in the small island of Westmannó, near Iceland, where, on a calculation of twenty years, 64 per cent. of all children died of trismus, between the fifth and twelfth day of life. In Iceland itself, between 1827 and 1837, 4479 deaths are recorded under this heading, or 30 per cent. of the total mortality. In the Faroe Islands, also, this cause of death is very great. In the west parishes of the Lewis—Uig and Barvas—it is still known, but it is rare, and it is believed that it is becomiug more and more so. St. Kilda and the west of Lewis are the only two spots in Scotland, if not the only two in Great Britain, where the disease still exists in an endemic form. The seizure usually occurs on the third day of life, and proves fatal within the week following. It is called in St. Kilda "*the seven days' sickness,*" and in the Lewis "*the five nights' sickness.*"

One curious effect of this great infant mortality is an increased fertility of the women. The average age of the 14 married women is 43½, and the average number of children to a marriage is 9; or 10, if we except the case of one couple without children. This fecundity appears to me to be explained by the infant's death doing away with the period of lactation, and so permitting impregnation again at an early period after parturition. On observing this, I turned with some interest to Schleisner's statistics of Iceland, and I find that exactly the same thing occurs there. He begins by observing that "almost all foreigners who have travelled in Iceland have mentioned the extraordinary fecundity of the nation as something remarkable." It is noticed that marriages with twenty children and upwards occur frequently. After a very careful analysis of the facts, he himself concludes that "the

fertility of the Icelandic women is a great deal greater than that of the Danish." He offers, however, no explanation, but the way in which I account for it in St. Kilda appears sufficient for Iceland also.

One woman in St. Kilda, at the age of thirty, has given birth to 8 children, of whom 2 live, while two others have born 14 each, or 28 in all, of whom 24 are in their graves. The pestilential lanes of our great cities present no picture so dark as this. It is doubtful if it is anywhere surpassed, unless in some of the foundling hospitals of the Continent.

In writing of a visit to a people whose fecundity is so great, one would hardly expect to meet a remark like the following:—"The absence of children about the houses is most remarkable;" yet, such occurs in the letter of one of my correspondents.

What influence this great infant mortality may have on the surviving offspring, taken *as illustrative of the effects of consanguine marriages*, it is not easy to say. Had trismus been a disease which exercised a marked preferential claim on the feeble, or had it been one from which recoveries occurred, bequeathing cerebral and other nervous lesions to those whose lives it spared, the influence would have been more clear. It does not appear, however, to make any such selection. The most robust children as well as the weakest, those born of vigorous parents as well as those of feeble, those born of incomers as well as those born of full-blooded natives, all appear subject to it, and none recover. I think, however, that this large infant mortality renders the case of St. Kilda altogether so exceptional and so peculiar, that it must be used with caution in this inquiry.

The occurrence of trismus in St. Kilda appears to me to be connected with the character of the houses in which the people live. I have elsewhere* described the dwellings of some of the Lewis people, from which those of St. Kilda differ but slightly. I am assured, however, that this slight difference is to the advantage of the St. Kildians. Cap-

* Appendix to *Third Annual Report of the General Board of Lunacy, Scotland.*

tain Thomas, who has had excellent opportunities of comparing the condition of both people, is of this opinion. He writes me that he regards them "as cleaner, better clothed, better fed, and better lodged." In this he is supported by Macculloch, Martin, and others, and much indirect evidence has been furnished to me leading to the same conclusion. From all I can learn, however, four important things are common to the houses of both places:—1st, There is no smoke hole. The thatch is put on nearly as much to be an accumulator of soot as a protector from rain, and it is removed every year for manure. 2d, The dung of the cattle, which are under the same roof, or rather in the same room, with the people, is allowed to accumulate below them from autumn to spring. 3d, There is a very scanty admission of daylight,—often none at all but that which enters by the door when open, or by chinks in the wall or roof. It is not a rare thing to find *no special provision* for the admission of light. 4th, As the thatch or roofing ends in the centre of the wall (which is 5 or 6 feet thick, and built of stone and turf), instead of overlapping it, and so throwing off the rain, the houses in such a climate are always, and of necessity, damp.

It is not a pleasant thing to see our fellow-countrymen inhabiting dwellings whose construction is so uncomplimentary to human intelligence. We say nothing of their internal economy.

It is a generally received opinion, that "nothing can be more satisfactorily proved than the tendency of a vitiated state of atmosphere to produce trismus."* Sixty years ago, in the Dublin Lying-in-Hospital, every sixth child born there died within a fortnight after birth, and nineteen-twentieths of these deaths were attributable to trismus. Dr. Clarke blamed the ventilation, improved it, and the mortality fell at once from 1 in 6, to 1 in 19·3; while under further changes, when Dr. Collins was master, the whole deaths fell to 1 in 58½, and of that diminished mortality only one-ninth resulted from trismus.

Schleisner attributed the disease in Iceland to the use of

* West on *Diseases of Children*, p. 143.

birds' excrements as fuel, and birds' fat for lighting purposes, and in St. Kilda it certainly happens that the oil of the bird called the fulmar is burned in the lamps, but I cannot believe that this is the cause of the disease.

I made careful inquiry as to the mode of dressing the umbilical cord, but I did not find anything so exceptional in this matter as to lead me to suppose that it was in any way connected with the disease.

In short, I can discover nothing which appears to me to be so probably the cause of this disease in St. Kilda as the style of house in which the people live, and I am of opinion that if their dwellings are improved, as has been generously contemplated, one result will be the extirpation of trismus, and another, the seeming paradox, that the women will bear fewer children, and yet have more.

Had it been a question of lambs instead of children, the people would themselves, long ere this, have found the remedy for this vast preventable mortality. It may be, however, that, with Macculloch, they look on it as, "politically speaking, a piece of good fortune."

These details must not be regarded as wide of the question of consanguine marriages. In dealing with it, I felt that I had to consider everything bearing on it, directly or indirectly. One pathogenic feature of a locality or people can hardly be studied alone, if we are to avoid unsound conclusions. The proof of this I think we have before us, for the large infant mortality, in itself and in its consequences, obliges us to use the St. Kildian experiences with caution and hesitation in the elucidation of the influence of consanguine marriages upon offspring.

Scalpay.

It is generally supposed that in no part of Scotland are marriages of consanguinity so frequent as in the West Highlands and Islands. When I came, however, to make an effort to get the extent of this frequency definitely stated in figures the result often surprised me,—the popular impression sometimes appearing altogether groundless. The island of Scalpay presents a case in point. The schedule of queries was for-

warded to the schoolmaster, who has long resided there, and knows every person on the island. The population he fixes at 341, and the number of married couples at 63, amongst whom it is said that there is not a single case of cousinship. Whether referable to this or not I cannot say, but it happens also, that there is not on the island either an idiot, an insane person, a cripple, or a deaf-mute. There is one case of blindness, but it was acquired in extreme old age.

In the marriage records of the Registrar-General, one of the headings, suggested I believe by Dr. Stark, is as follows :— "Relationship of parties, if any:" In the large island of Lewis more than in any other place was I led to believe that these marriages abounded. The subject is much discussed there, and both the distinguished proprietor, and his chamberlain Mr. Munro, have directed their attention to it, as a source of evil to the people. I was, therefore, curious to learn the number of marriages registered there as between relations, and I embraced an opportunity of examining the registers of the parish of Uig, and with this result. Of 103 marriages registered during the five years from 1855 to 1859, a relationship between the parties is recorded only in two cases.

Again, through the kindness of Mr. Munro, I possess similar information for the parishes of Stornoway and Barvas. In the first, for the years 1858 and 1859 and for 1860 to October, 109 marriages were registered, and in none was any relationship recorded. In Barvas for the same period, 99 marriages were entered, with relationship given in two cases, and here it was not close, being in the one case that of "second," and in the other that of "third cousins." Out of a total, therefore, of 311 marriages, there were only 4 in which the union was between persons related by blood, or 1 in 78. And this, too, in a district where cousinship between man and wife is reputedly very common, and where the fixity of the population gives such a reputation an *à priori* probability.

My conviction, however, is that the public records do not exhibit the true state of the matter. I think the popular notion exaggerates the reality, while, on the other hand, the marriage registers understate it.

Let me here detail some facts, which were the result of my own observation in the island of Lewis, and which bear immediately on the question we are discussing.

I reported on 35 cases of insanity, and of these 31 were idiots or imbeciles.

When analysed in their bearing on consanguine marriages it is found that there were born,—

1. Of parents known not to be related - - -		16
2. Of parents known to be related,—		
Of cousins - - - -	2	
Of second cousins - - -	3	
Of parents more distantly related -	6	
Of parents who were the children of cousins - - - -	1	
	—	12
3. Of parents of whom nothing could be determined. (This includes illegitimates), - - -		7
		35

It thus appears that *at least* one-third of all the cases show a blood-relationship in their origin. On the supposition that this relationship has no influence on the production of idiocy, we should expect to find it in one-third of all unions in the island. This, however, would greatly exaggerate the frequency of such marriages. So that, after deducting freely for other causes of idiocy, many of which are unusually strong in this island, there still remains a large measure of this calamity, which with good reason we may regard as due to consanguineous marriages.

Bodily malformations are frequent in the Lewis. In the parish of Uig, hare-lip is very common. Nine cases were brought to my own knowledge. In the Lewis, and the parishes opposite to it on the mainland, I saw five cases in which there were supernumerary little fingers, one in which there were two thumbs, and one in which the fingers and toes were webbed. Curvature of the spine, deformity, and lameness were often seen in the island. Cases of congenital blindness and deaf-mutism are also numerous. I saw seven epileptics, several instances of chorea, and many of paralysis.

Berneray.—Lewis.

For information respecting this island I am indebted to Mr.

John Macdonald, to whom I transmitted a series of questions, and who put himself to much trouble in order to give correct replies. He is the land-steward, an old residenter, and intimately acquainted with every family.

Berneray, which is in the parish of Uig, contains 427 people, and 74 married couples. Two of these are between full cousins, yielding 10 children, of whom 8 live. Not one of these is either insane, imbecile, idiotic, deaf, dumb, blind, lame, deformed, or in any other way defective in mind, morals, or body. Further, 6 marriages are between second cousins, yielding 20 children, of whom 18 are alive. Nine of the living children belong to one couple, the remaining 9 springing from 5 marriages. As in the offspring of those who were full cousins, so of these also is the report of both bodily and mental health without flaw.

We have thus a population where every ninth marriage is between blood-relatives; yet, instead of finding the island peopled with idiots, madmen, cripples and mutes, not one such person is said to exist in it.

Large as the number of such marriages is, it is below the expectations of my informant, who no doubt accepted the popular estimate of their frequency. My attention was directed to Berneray as a place where I should find them excessively numerous, considerably more so even than in the Lewis itself, and such appears to be the case. But had I taken the estimates which were given to me orally or by letter, without subjecting them to actual numeration, I should have been led to conclusions of great inaccuracy. This remark does not apply to Berneray alone, but to many other places to which my attention was drawn as likely to furnish information on this subject, and about which I took occasion to correspond. Of one such, for instance, on the N.E. coast of Scotland, I was told that "about 50 per cent." of all the marriages were between persons related by blood. I visited this village, and satisfied myself that the estimate was enormously above the fact, and that without actual numeration I could not safely use any such general and indefinite information.

Mr. Macdonald expresses his astonishment thus:—"I was

much surprised to see so few first and second cousins married in Berneray island, and were I not certain of it, as I am now, by a minute search, I would doubt the fact, from the island being inhabited by the present race from time immemorial."

He tells me that the island is remarkably healthy, and that cases of longevity are common. He cites the instance of a man who died in 1859 in his 99th year, having 2 sons, 5 daughters, and 132 grand and great grand-children.

One of my queries ran thus :—"In general terms, have you observed in the island of Berneray that the intermarriage of blood-relations affects the offspring injuriously in their bodily, mental, or moral health?" To which he replies,—"I have observed no such injurious tendency in this island." Had he answered this question before collecting the foregoing facts, I feel satisfied he would have done it differently, for immediately after the answer he appends this note :—"In Valtos, a township in this parish, a couple, full cousins, natives of Berneray, have two or three children both deformed and imbecile." The great affliction in this case, associated with a cousinship of the parents, would almost certainly have presented itself to his mind when called on to give the opinion asked, and would probably have coloured his reply had he not had the facts regarding Berneray in figures before him.

Phthisis in the Hebrides.

I have here to direct attention to a singular pathogenic feature of the Western Islands, to four of which special reference has been made. I first heard of it from M. Boudin, whom nothing relating to the geographical distribution of disease seems to escape. Several years ago, when writing to me about the absence of phthisis in Iceland and the Faroes, he pointed out that in Great Britain also it seemed to diminish in frequency as we went North, and that in Lewis especially its rarity was very observable. Now, consumption and strumous diseases generally are believed to be among the most certain results of consanguine marriages; and it appeared to me strange that in that part of Scotland where such marriages most prevail, these forms of disease should be reputedly rare. Accord-

ingly, while in these islands, I made careful inquiries on the subject. Immediately after my return, a very able paper on "Phthisis in the Hebrides," written by Mr. Morgan, appeared in the *Medico-Chirurgical Review*.* He founds his conclusions on his own observation in Raasay, and on the testimony of a large number of medical men practising in the North-West Highlands and Islands of Scotland, who communicated to him their experience on the subject. The impression which a perusal of this evidence leaves on the mind is, that the disease is not simply comparatively rare, but that it is almost absent. The predecessor of Dr. Millar (in Stornoway), when filling up schedules of life insurance, to the question relating to the death of the proposer's relatives by phthisis, is said to have invariably answered,—"No such disease is known in the island." Both Dr. Millar and his colleague Dr. Macrae, the only two medical men in the island, I understood to say, that though the disease appeared to them rare, it was by no means absent. Had I been left to form a conclusion from what I myself had an opportunity of seeing and learning while on the spot, it would have been to the same effect. The *impression* of its rarity was irresistible, while at the same time I was assured of its presence by actually seeing several cases. I am inclined, however, to think that it is not so rare as Mr. Morgan appears to regard it; but the difference of opinion hinges only on the degree.

In July 1860, when in the parish of Uig, on the west coast of Lewis, where I was led to understand the minimum of frequency was attained, I examined the registers for the two years 1858 and 1859. During that period 75 deaths are recorded, and of that number 8, or 1 in 9 are entered as resulting from consumption. Yet in the parish of Harris, immediately to the south of that, Dr. Clark, during 32 years, could not remember more than half-a-dozen deaths from phthisis.†

It is possible, however, that these 8 people did not really die of phthisis, as I found that, of the 75 deaths, in 2 cases only was the cause of death entered under the certificate of a medical man. From 1855 to 1859 inclusive, only four deaths were so certified. Those who have visited this part of Lewis,

* *Med.-Chir. Rev.*, No. 53. † *Med.-Chir. Rev.*, No. 53, p. 484.

and know its extreme inaccessibility, will not wonder at this. From such data, therefore, conclusions must be drawn with caution.

It may serve further to strengthen this view, if I give all the causes of the 75 deaths, when it will be observed, that it is not merely in the absence of phthisis that the pathogeny of this district differs from the rest of Scotland :—

1859.	1858.
3 Consumption.	5 Consumption.
1 Croup.	2 Croup.
1 Asthma.	1 Influenza.
14 Influenza.	11 Old age.
3 Inflammation.	8 Not known.
1 Old age.	4 Inflammation.
7 Not known.	2 Dropsy.
2 ?	1 Exposure to cold.
—	1 Rheumatism.
32	1 Epilepsy.
	3 Drowned.
	1 Palsy.
	1 Fever.
	1 Smallpox.
	1 Lockjaw.
	—
	43

The north-west parishes of Scotland as well as the Hebrides reputedly enjoy a comparative immunity from consumption.

In Ardnamurchan, with a population of 5000, a medical man assured Dr. Browne that, during sixteen years, he had seen only two cases of phthisis. In the neighbouring parish of Kilmallie, however, 306 persons died during the five years from 1855 to 1859, and of these 33 died of phthisis, or about 1 in 9, while pneumonia, asthma, and bronchitis together, killed other 22. In all, 55 appear to have died of thoracic disease, or 1 in $5\frac{1}{2}$.

Struma in its other forms is also said to be rare in these districts, and my own observation, which would have been of little value, from the shortness of my stay, had my attention not been directed to the subject, supports this.

I have introduced these remarks on phthisis in the Hebrides because I felt that, in considering the effects of consanguine marriages on the production of idiocy in this district, the

marked rarity of one of the most generally admitted effects of those marriages demanded allusion and comment.*

Burnmouth and Ross—fishing village on the south-east of Scotland.

My attention was drawn to this place as being one in which consanguine marriages were very frequent, yet where the alleged evil results were not found.

I have had three opportunities of visiting this village, and on each occasion I made minute inquiries regarding the frequency and effects of such marriages, and I collected at the same time as many facts as possible bearing on the question.

The village is situated at the foot of the cliffs and close by the sea-shore. Its position has originally depended on its suitability for smuggling operations, and not on its salubrity, since the houses are necessarily rendered damp and unhealthy by the proximity of the rocks. The colony is not more than 120 years old, and the first settlers are believed to have been of a good stock,—bold and enterprising men. Some of them, in the navy and merchant service, distinguished themselves during the war, and rose to good positions, not through courage alone, but also through a superior intelligence.

The fisherman of Burnmouth at present are tall, strong, active men; swarthy, high-featured, and strongly whiskered.† They were long regarded as a saving, provident, and sober people. They are remarkably well and warmly clothed, every man having a good and complete waterproof suit for use at sea. In this respect the contrast between them and the fishermen of the Ross-shire and Morayshire coasts is striking. They are good boatmen, and have large decked boats, with which they go to Yarmouth, the Isle of Man, and the Lewis. Some-

* Since writing the foregoing (in January 1861), I have had an opportunity of perusing Dr. Stark's observations on the same subject in the First Detailed Annual Report of the Registrar-General. He seems to regard it as proved that the Western Islands exhibit a marked freedom from consumption, but does not think the registers afford materials for giving the precise measure of the exemption.

† They are believed to be of Anglo-Norman origin.

thing of the character and spirit of the men is learned from the very names of their boats—"The Dexterous," "The Flying Cloud," "The Speedy," and such like,—contrasting curiously with such names as "The Isaac Main," "The Martha Paterson," etc., so general in the north-east. The two fish-dealers or curers of the village are of their own stock, and not of a different and imported class, as happens so generally in the north. They nearly all read and write, and at present very few children at a school-going age are not regularly there.

The women are also tall, stout, and high-featured, have no peculiarity of dress, and do not carry the fish to market. Each family keeps a servant—often the daughter of a hind.

The houses, in spite of their dampness, are clean, orderly, and well furnished, and equal in all appliances for comfort to the houses of the labourers or tradesmen of the district. My description is that of an average house, to which of course there are exceptions. There is, in short, a general evidence of well-being in the whole surroundings of the people.

The population of the two connected villages of Burnmouth and Ross is generally estimated at 420.

Careful inquiry only brought to light seven marriages between full cousins, and I could not hear of a single case where man and wife were in the relation of second-cousins. There are, however, many marriages between persons where a blood-relationship is recognised, but which is so distant and undefined as to be without a name.

Of these 7 cousin-marriages the result is seen in the following table:—

	No. of Children born.	No. Dead.	No. Living.	Remarks regarding the Children.
I.	6	3	3	Those living, big, strong, sound, & healthy. Those dead, said to have been sound.
II.	6	...	6	"Never had a headache."
III.	9	1	8	All sound and sane.
IV.	1	...	1	Sound. Newly married.
V.	3	2	1	The living one not robust.
VI.	5	1	4	All sound.
VII.	5	...	5	All alive and sound.
Totals.	35	7	28	

This certainly does not appear to speak strongly against a blood-relationship of parents. Thinking that I might find the evil manifesting itself in the next generation, I made inquiries as to the families of those of the 28 living children who are married. Of these, there were only three, and each of these had married a person distantly related by blood. The result is shown below.

	No. of Children born.	No. Dead.	No. Living.	Remarks regarding the Children.
I.	7	1	6	All healthy.
II.	6	2	4	All the living sound. The two deaths were in infancy.
III.	...	...	...	Barren.
Totals.	13	3	10	

Here again, however, I did not find what might have been expected, and I then made inquiry as to the number of persons defective in mind or body in the whole community, and with the following results. There were found,—

a. Two imbeciles, whose weakness of mind was not great, and who were both self-supporting. Neither was the child of parents related by blood.

b. Two cases of acquired insanity, both women. The disease in both cases resulted from grief and fright on suddenly hearing of the death of their husbands by drowning. The parents of one were distantly related.

c. One case of epilepsy in a child, whose parents were not related. The fits are not frequent, and the mind not much impaired.

No lame, deformed, blind, dumb, or paralytic person was heard of; and in the school, which was twice visited, and where nearly all the children of the village were seen, strumous sores were not found, nor were the children puny, pale, or languid. They were, on the contrary, merry, active, well clothed, and with a look of substantial feeding. Their teacher, however, considers them to be slower and duller than the other children under his care.

None of the children of cousins were here found defective

in mind or body. There was found, however, in the whole community a considerable number of unsound persons—a proportion to the whole population above that for Scotland generally.

On making inquiries as to the number of paupers in the village, I found that there were six—all widows. Of four, the husbands were drowned, and two are aged women (86 and 93), who have outlived their husbands, children, and all natural supports. On the whole, this also indicates a favourable state of the community.

It then occurred to me that there might possibly be a larger infusion of fresh blood than was generally thought, and I am inclined to believe that this is the case,—more particularly of late. It is a saying of the district, that "a Burnmouth man never goes to the bankhead for a wife"; and in smuggling times, when secrecy was needed and when it was desirable to keep a knowledge of their doings and connexions among themselves, it is possible that this was nearly true. It is not so, however, now, for five of the married women are known to me to be imported, and there are probably more. All of these were the daughters of hinds, who entered the place as servants. In addition to these there are also many married women who are the children of imported mothers. There is thus a considerable infusion of fresh blood into this small community.

With regard to the rate of infant mortality, the tables which I have given show that this is not small, but it is by no means remarkably large. It further appears, from the parish registers which I searched, that during the three years, 1857 to 1859, 21 persons died, of whom 7 were drowned, and 4 died under the age of six months, and 1 more under ten years. During the same period 33 children were born, of whom 3 were illegitimate.

During the five years preceding my visits only one marriage has been recorded in the registers as between cousins.

The general feeling of the people, as communicated to me, is distinctly against such marriages, which they regard as "bad for the offspring". One shrewd old woman, however, added this important remark,—"But I'll tell ye what, Doctor, bairns that's hungert i' their youth aye gang wrang. That's far waur nor sib marriages."

The Fishing Population of a small Town on the North-East Coast of Scotland.

For information regarding this place I am indebted to an educated fisher-lad who resided there, and who collected the facts under the superintendence of a person intimately acquainted with the whole fishing population. I have myself had several opportunities of testing the substantial accuracy of the statements.

The fishing population is estimated at 779, and contains 119 married couples, and about 60 widows and widowers with or without families.

Of the 119 married couples, in 11 cases the union is between full cousins, and in 16 between second cousins; or, in other words, in 27 instances there is a blood-relationship. This is in the proportion of 1 to 4·4 of all marriages. Of these 27 marriages, including 3 which are barren, 105 children have been born. Of these children, 38 are dead (35 having died in childhood), 4 are deaf-mute, 4 are imbecile, 4 are slightly silly ("want a cast"), 1 is paralytic, and 11 are scrofulous and weakly. In other words, 24 out of the 67 living children labour under defects of body or mind, while 1 in 17 is an avowed imbecile, and 1 in 8·4 is weak in mind. These facts are of such a character as to lead us to suspect that more than one of the causes of idiocy must be strong in this community.

The children of those who are full cousins* are described as being "*all* of them neither strong in mind nor in body", and the fishers of this place, as a class, are said to be "below par in intellect". In this last opinion I am inclined to concur. It is true, I believe, not of this locality alone, but of nearly all the fishing villages which fringe the north-east coast of Scotland. There is a general lowering of the physical and mental strength in these communities, which is popularly attributed to this system of in-and-in breeding. When compared with the agricultural population, or with the tradespeople of the small towns in the neighbourhood, they are, as a race, inferior both in bodily vigour and intellectual capacity, while their thriftless-

* There is *said to be* an aversion to cousin-marriages, but, it is added, "cousins' bairns go together readily."

ness, facility, and want of foresight are notorious. This opinion is founded on personal observation, as well as on the testimony of others. It is popularly thought that, in this respect more than in any other, the evils of consanguine marriages, continued from generation to generation, are evidenced,—the defect at length appearing to become *racical*. I must here state, however, that so far as my own observation goes, and so far as I have learned from others, there seems to be in such communities no exceptional liability to acquired insanity. Indeed, it is believed by many rather to be otherwise.

It has often struck me that the men of these villages had small heads, and so strong has this impression become of late, that I resolved, if possible, to test its accuracy by measurement. I have been fortunate in securing the assistance of a gentleman, who has obtained much curious information for me from the large hat manufacturers of Scotland. I shall not at present communicate this in detail, but shall content myself with stating such facts as may possibly bear on my inquiry.

All unite in saying that the average hat for Scotland is "$7\frac{1}{8}$ small",—representing a head $22\frac{1}{4}$ inches in circumference, or rather more. The average, however, for the east-coast fishing villages, from Fife to Caithness, is $6\frac{7}{8}$ and 7, representing circumferences of $21\frac{5}{8}$ and 22 inches,—the extreme north having slightly the advantage. The difference is better seen thus:—A merchant whose trade lay in any small town in the agricultural districts, say of Perthshire, and whose stock was exhausted, wishing to renew it by a purchase of two dozen hats, would select sizes as given below; while a merchant whose stock was in the same position, and who supplied a fishing village on the north-east coast, would make a different selection, as is also shown below:—

Small Town in Agricultural District of Perthshire.				Fishing Village on North-East Coast of Scotland.			
1	of	$6\frac{6}{8}$	size.	3	of	$6\frac{5}{8}$	size.
2	...	$6\frac{7}{8}$	...	6	...	$6\frac{6}{8}$	...
5	...	7	...	8	...	$6\frac{7}{8}$	...
8	...	$7\frac{1}{8}$	...	4	...	7	...
5	...	$7\frac{2}{8}$	...	2	...	$7\frac{1}{8}$	...
2	...	$7\frac{3}{8}$	...	1	...	$7\frac{2}{8}$	...
1	...	$7\frac{4}{8}$	...				
24; mean, $7\frac{1}{8}$				24; mean, 7			...

The small towns in the agricultural districts of Aberdeenshire exhibit a still larger mean size, and the upper central district of the Stewarty of Kirkcudbright perhaps the largest in Scotland.

It appears probable from these figures that in the district referred to the fisherman's head is really a small one, but if any one desires easily to convince himself that it is so, he has only to try to fit a $7\frac{1}{8}$ head with a "sou-wester" in the shop of a fishing village on the north-east coast. I have myself repeatedly seen this trial made.

Fishing Villages of Portmaholmack and Balnabruiach, in Easter Ross.

For the information which this locality supplies, I am indebted chiefly to Mr. John Ross, inspector of poor of the parish of Tarbat.

The population of the two villages, which adjoin each other, is estimated at 1548, and the number of married couples at 355. Of the marriages there are 62 between full cousins, and 20 between second cousins or between persons more distantly related. There is a blood-relationship, therefore, in 82 cases, or, in other words, in nearly one-fourth of the whole number of marriages.

The number of children born of these 82 couples was 340, of whom 250 are alive.* Most of those who are dead, were cut off in infancy, and nearly all of them below the age of 10.

Of the whole number of the offspring of these consanguine marriages there are, or were, 2 imbeciles, 1 idiot, and 2 cripples.

The number of children born of the other marriages, where the parents were not related by blood, was not ascertained, but at the same birth-rate, it should amount to 1160, and, the mortality in childhood being the same, there should be 852 now alive. Although the whole number of the offspring was

* These numbers are not given as *absolutely accurate.* Except by an official inquiry such accuracy could not be attained. The facts, however, were collected with care, and, I am assured, may be regarded as "*very correct.*"

not determined, it was found, however, that it included 4 imbeciles, 2 idiots, 2 insane, and 2 cripples.

This result shows that such calamities fall on the offspring of blood-related parents with greater frequency than on the offspring of parents not related; in the proportion of 2 to 1·2. But this by no means comes up to common expectation. When I began this inquiry my reading on the subject had prepared me to expect worse results, and conversation with Mr. Ross led me to suppose that I should find such anticipations realised in the statistics of these villages. In transmitting them, however, he observes: "It is my opinion still, notwithstanding the above figures which apparently speak favourably, that such intermarriages tend to lower the physical and intellectual powers of the offspring. Yet in a locality such as Portmaholmack, where out-door exercise and ablutions in salt water are a part of the everyday business of life, I am fully convinced that the evil effects are in a great measure counteracted by these healthy occupations." He makes this remark in reply to a query asking his own opinion on the subject, "as founded on observation in these villages."

General Remarks.

This concludes the evidence which I have collected under the second mode of inquiry recommended.

With reference to none of the localities have I been able to obtain the full information I aimed at. Indeed, I am very conscious that I am far from having succeeded in doing what I proposed to myself. I regret this all the more that I think no method of investigation would so satisfactorily settle this vexed question as that now referred to. The result of my efforts, however, convinces me that it could not be carried out in a thoroughly satisfactory manner by any private individual. If, for several districts of the country not too limited in size, and differing from each other *quoad* the social condition of the people, we could obtain full and accurate information as to the family history of *every* marriage in which a blood-relationship existed between man and wife, and also of *every* marriage in which no such relationship existed, we should assuredly have

before us a mass of facts from which we could draw conclusions of a definite character and worthy of trust; but to obtain possession of such data will never prove an easy task.

It appears to me, however, that my research, though it has fallen short of what was intended, has nevertheless resulted in the collection of some useful and interesting matter, through which a certain amount of light is thrown on the influence of consanguinity in parentage upon children. The facts which I have detailed appear to show a great unsteadiness in the character of this influence. Sometimes we seem to find little or no proof that it is an evil influence. At other times this bloodship in the parentage appears to be the origin of much injury to the offspring. More frequently still the facts admit of various interpretations, and are not very clear or satisfactory in their teaching. It is of importance, however, to know that these differences or seeming differences may occur, and to learn that it is necessary to widen the field of observation, and carefully to inquire into all those circumstances by which it is quite clear the results may be and often are exaggerated, modified, or concealed. It is evident that these results will not be the same under all circumstances,—nay, more, it becomes probable that, to some small extent at least, we have the power of controlling them.

In detailing the facts with reference to each locality, I have done my best to secure accuracy, and to be as full as was consistent with relevancy. As regards the last point I had often the difficulty of doubt, but I have omitted nothing which in my opinion could in any way bear on the question. As regards the first point it must be remembered that a great part of the information was collected for me by others, whom I regarded as competent and trustworthy. I had myself opportunities of visiting many of the localities, when I made such inquiries as I thought would test the value of the statements communicated to me; and where I had not such opportunities, by frequent writing I did what I could to ensure a substantial accuracy, which was all I could reasonably expect.

I have made no effort to arrange or group the facts so as to

support one theory or the other, but have given them disjointedly, with such occasional remarks or reflections as they suggested. Each reader can thus form his own opinion as to what they teach.

If taken *as a whole* and fairly interpreted, it appears to me that they lead to the same conclusion as that drawn from the first line of inquiry, viz., that consanguinity in parentage tends to injure the offspring.

They appear however, to point to more than this general conclusion;—as, for instance, that in all classes and conditions of society and under all circumstances, the manifestations of this injury are not alike either in character or degree. It would seem that when these unions of kinship are continued through many generations (in certain classes of the community at least), the evil may show itself rather in a general deterioration of the race than in striking abnormalities and defects. Again,—the results appear to be least grave, when the parents are living in tolerable comfort, without ambitions, anxieties, or much thought of the morrow; when they follow healthful open-air occupations, living by their muscles but not overworked, and easily earning enough to procure good food and clothing; when they lead routine but not indolent lives, working but not struggling for existence; when they have a fair education, but are without pretence of refinement; when they steadily adhere to sobriety; when, in short, they have good constitutions and are able to manage these wisely after marriage. On the other hand, when the parents are poor, pinched for food, scrimp of clothing, badly housed, and exposed to misery; when they have to toil and struggle for the bare necessaries of life—never having enough for to-day and being always fearful of to-morrow; and especially when, in addition to all this, they are intemperate in their habits, then we find serious evidences of injury, the congenital forms preponderating and bodily malformations being frequent.

It will at once be perceived that, even if consanguinity in parentage had no tendency to injure the offspring, the results I have just described might be expected to follow the con-

ditions I have described. Where the whole surroundings and mode of life of a community are such as keep the health-point high, it is clear that *all* sources of disturbance, whatever be their nature, will be controlled in their operation; and where the reverse holds, these sources of disturbance will be favoured in their work, and intensified. Even diseases which are purely hereditary will be transmitted to the offspring with a force and frequency which will vary according to circumstances,—according to the circumstances, indeed, of which we are now speaking. But it must be borne in mind that the injuries which result from consanguinity in parentage are very closely akin to injuries from hereditary transmission. It is believed that they are so at least in the great majority of cases,—since they generally result from this that, where there is a blood-relationship between parents, both of them are more likely to have the same disease to transmit to their children than they would be if there was no such relationship; which disease, going down from *both* father and mother, will probably present itself among the children frequently and in a severe form.

It occurs to me here to state that in forming some of the opinions expressed in this paper, I have been insensibly influenced by a host of little things which have come under observation during the inquiry, and which I could not here detail. Such an influence, I think, is legitimate, and can scarcely be resisted. It would be more correct, perhaps, to speak of it as having given strength or weakness to conclusions drawn from stateable evidence, than as having itself led to separate and independent opinions.

Before proceeding to give the general conclusions which I have drawn from the whole research, I shall briefly examine the argument from the practice of in-and-in breeding in the lower animals.

Argument from in-and-in Breeding in the Lower Animals.

One would expect to find this field of inquiry peculiarly rich in experiences tending to clear away doubts as to the effect of unions of consanguinity. In the breeding of his stock, the farmer exercises a complete control over all arrangements, and

knows definitely the character of the issue. From such opportunities and advantages we might reasonably look for precise information. This will not, however, be found either in the literature of farming, or from personal inquiry of those who might be presumed to possess it. All farmers, however, are united in expressing the general opinion, that *in-and-in breeding* tends in the long run to the deterioration of the stock. But this statement receives one qualification from one, and another from a second, and so on, according to individual experiences and with special bearings.

The system of in-and-in breeding appears to have been most practised in Short-horn cattle and Leicester sheep. With regard to the latter, it is notorious that Bakewell bred only from his own stock, and, as Professor Low says, "did not "scruple to connect together animals the nearest allied in blood to one another."* Colling, too, in perfecting his Short-horns, did the same, "disregarding affinities of blood."† Mason of Chilton is also said to have pursued the same course. And Mr. Stephens says, that "there are breeders in England at the present time who maintain that it is the best system, and will follow no other."‡ In rearing game-fowls, Mr. Blaine tells us, that the intercourse of a third remove is sought and considered best;§ and one of my correspondents, the possessor of a flock of fine old Scotch sheep, numbering about seventy, informs me that they are all related by blood, and have been so for eighty years. I am assured that some winners on the racecourse have had the same sire and grandsire, being also nephews of their own sires. The same thing I believe to be true of many of the prize-taking Short-horn bulls and Leicester tups.

One is startled by such facts and statements, which are not easily reconciled to common notions, nor to the disapproval of in-and-in breeding which is generally and distinctly expressed. Youatt gives his opinion thus,—"Though some may deny it, it is the fact that strict confinement to one breed, however

* Professor Low, *Domestic Animals*, 191. † Low, *op. cit.*, 382.
‡ *Book of the Farm*, Stephens, 6273.
§ *Outlines of Veterinary Art*, 3rd edition, 325.

valuable or perfect, produces gradual deterioration;" and Sir J. Sebright, a great authority, says,—"I have no doubt by this practice being long continued, that animals would in course of time degenerate to such a degree as to become incapable of breeding at all." Professor Low tells us, that even Colling latterly "began to experience that impairment of constitution in his animals which never fails to accompany a continued intermixture of blood in a limited number of animals." In short, nearly all give a general disapproval and condemnation of the system. The precise character of the evil Mr. Stephens states more definitely than other writers,—indeed, no one discusses the whole subject more fully. In his work on the Farm, he tells us,* that the bones become small and condensed in texture, the skin thin and open, the hair or wool short and thin set, the head and hoofs small, the ears thin and broad, the carcass reduced in size, and the eyes often affected with wateriness; that lameness is frequent; that a liability to catarrhal affections and consumption is established; that disposition to fatten appears; and, generally, that the whole constitution is much weakened. Professor Low,† in speaking of sheep, says, that the system acted on for many generations tends "to render the animals more the creatures of an artificial condition, more delicate in temperament as well as form, less prolific of lambs, and less capable of supplying milk to their offspring.

I have also seen it remarked that the offspring of such unions are placid and not easily disturbed when feeding, exhibiting a sort of imbecile indifference to what goes on around them,—a quality of great value for quick fattening on little food.

The more, however, that the history of Short-horn cattle and Leicester sheep is studied, the stronger does the impression become that these breeds are but the perfection of desirable imperfections—desirable, too, not to the animal itself, but to its owner.

Everything is "secondary to the property of producing in the shortest time the largest quantity of fat with the least consumption of food." The great desideratum is an early arrival

* Stephens, *op cit.*, 6274.

† Low, *op. cit.*, 192.

at maturity, or at premature age,—an early maturity, too, of particular parts,—of muscle and fat especially.*

After all, then, in these cases where in-and-in breeding has been practised with so-called good results, the issue is nothing but the development of a saleable defect, which, from the animal's point of view, must be regarded as wholly unnatural and artificial, and not calculated to promote its wellbeing, enjoyment, or natural usefulness; and in this view all difficulties disappear. By in-and-in breeding we can certainly establish an artificial type, and fix a peculiarity which is unnatural, and whose only value is its profitable convertibility into gold; but no evidence whatever exists that by such a system of breeding we can improve the natural animal.

Strictly viewed, Colling's "Comet" was neither more nor less than a perfect abnormality—a deviation from a natural animal, perfect in a desired direction. Just as this sort of perfection increases, however, the less useful does the animal become to himself, *if left to himself*, and if deprived of that artificial keeping and management which his artificial constitution demands. If it should become desirable to perpetuate any *peculiarity* in man, then in-and-in breeding may have *good* results,—the results being estimated as good or bad according as they realise, or do not realise, the end in view. I know the case of a man who has supernumerary little fingers, and whose two children and seven grandchildren have the same. Were additional little fingers of great value, the surest way to obtain a race having this peculiarity would certainly be to establish blood-alliances in this family; and when we obtained the desired excess of fingers in the offspring, we should then have the same sort of reason for saying that kinship of parentage had done good, as the farmer has for saying that it has done good when he looks on his Leicester sheep, with little heads and small bones,—ripe, fat, and ready for sale in their very lambhood.

Till the excellencies of man are estimated in pounds or inches; till the aim be a perfect artificial and not a perfect

* Low, *op. cit.*, 192 and 388.

natural man; till we want legs at the expense of arms, or arms at the expense of legs, or brain at the expense of muscle, or muscle at the expense of brain; till we want maturity in babyhood, and premature age; till the perfect man be something else than a well-balanced development of all his components, bodily and mental,—we can scarcely apply the experience of breeders of stock in human physiology.

Conclusions.

The general conclusions to which I have been led by this investigation are briefly as follows:—

I. That consanguinity in parentage tends to injure the offspring. That this injury assumes various forms. That it may show itself in diminished viability at birth; in feeble constitutions increasing the risk of danger from the invasion of strumous disease in after-life; in bodily defects and malformations; in deprivation or impairment of the senses, especially those of hearing and sight; and, more frequently than in any other way, in errors and disturbances of the nervous system, as in epilepsy, chorea, paralysis, imbecility, idiocy, and moral and intellectual insanity. That sterility or impaired reproductiveness is another result of consanguinity in marriage, but not one of such frequent occurrence as has been thought.

II. That when the children seem to escape, the injury may show itself in the grandchildren; so that there may be given to the offspring by the kinship of their parents a *potential* defect which may become *actual* in their children, and thenceforward perhaps appear as an hereditary disease.

III. That many isolated cases, and even groups of cases, present themselves in which no injurious result can be detected. That this may occur even when all other circumstances are of an unfavourable character.

IV. That, as regards mental disease, unions between blood relations influence idiocy and imbecility more than they do the acquired forms of insanity, or these which show themselves after childhood.

V. That the amount of idiocy in Scotland is to some extent increased by the prevalence of consanguine marriages, but that

the frequency of these marriages does not appear to be so great as has been generally supposed.

I have already indicated my views as to the way in which consanguinity in parentage tends to injure the offspring. It matters, however, comparatively little whether these views are correct or incorrect. The chief thing is to show that the injury exists, and that therefore consanguineous marriages should be avoided. This is what may influence the wellbeing of society, and it is the point of importance in the inquiry. In adducing the evidence which seems to me to prove the existence of this injury, I have been careful not to do anything which would lead to an over-estimate of its amount—an error which has been frequently committed. I think, however, that I have been able to show that the injury is not trifling, but that it is of such value as to merit serious consideration, and to regulate conduct.

But though speculation as to the *modus operandi* may properly be regarded as a secondary matter, it is not altogether profitless; and therefore, before concluding my paper, I shall somewhat amplify the views on this subject which I have already had occasion to indicate.

Let us suppose that man is represented by a series of qualities which either fall upon the straight line of physiological perfection, or which have a greater or less divergence from it on either side, above or below.

Let us also suppose that it may be accepted, as true in a general sense, that parents live again in their offspring. Though the child is not the exact algebraic sum of his parents, yet both are constantly expressed in him, and the *plus* qualities of the one, or those above the physiological rule, are either increased by the corresponding qualities of the other parent, if their divergence be in the same direction, or they are diminished by them, if the direction of divergence be different. In the first case there is an increased departure from the normal line, *plus* being added to *plus*. In the last

case, on the contrary, there is an actual approach to the line, *minus* neutralising *plus*.

Let us now take some known transmissible peculiarity—a temperament, for instance, than which perhaps nothing more certainly passes from parent to child, and which, as a peculiarity, involves both *plus* and *minus* qualities.

And let it be admitted that there are few family traits so constant as temperament,—that is, that among persons closely related to each other the same temperament is almost sure to appear with frequency. In a blood-alliance, therefore, the chances are much greater that a husband and wife will have the same temperament than in an alliance without kinship.

Let us suppose such a blood-alliance, and that man and wife do both exhibit the same and a well-marked temperament. Their child is thus liable to receive it from both sides.

It is of course *possible* that he may not receive this temperament at all but one very much opposed to it, just as he may not inherit a predisposition to insanity though both his parents have been insane, but it is certain that the risk is great that he will do so.

Keeping to temperament as the transmissible peculiarity which we use in illustration of the subject, and supposing the child to receive from both parents the same temperament, then it is highly probable that it will appear in him in a stronger form, and the divergence from the perfect state will be augmented on both sides—the *plus* strengthening the *plus* qualities, and the *minus* the *minus*. The balance of development may thus be seriously disturbed, and high disproportions may arise, which pass the limits of a temperament and become acknowledged or recognised defect.

It is clear that the chances of such a result would have been lessened if one parent had come of a different stock, and, therefore, that the more extensively consanguineous marriages prevail, the greater is the risk of finding in the community all sorts of transmissible peculiarities dangerously intensified. Such unions also tend certainly, and in a similar way, to increase the power of the hereditary transmission of disease, and they practically augment the risks of evil from that source.

It very frequently happens, in investigating the history of a cousin-marriage, that the defect which appears in the children has been found to have appeared also among the progenitors of the children. Such a case we would naturally call a simple one of hereditary transmission, assigning no part to the consanguinity. A large number of cases of this kind have come under my observation. But when they have been minutely inquired into; when the history of other marriages, not between cousins in the same family, has been examined and contrasted with those which were between cousins; and when the injury appearing among the children has been compared, both as to extent and severity, with that which had appeared among their ascendants, no doubt has been left on the mind that the consanguinity had given force to the heredity.

What has been held to be true of a mere temperament would of course be true also of any other transmissible peculiarity, defect, or disease. Take deaf-mutism, for instance, and with reference to it we happen to have some interesting facts. It has been ascertained that if a deaf-dumb person is married to one who hears, the chances of their having a deaf-mute child will be 1 to 135; but if deaf-mute persons intermarry, the chances rise to 1 to 20.* This is a remarkable fact, and well illustrates my argument. A similar (though perhaps not the same) rise in the rate of production of deaf-mute children would follow the marriage of deaf-mute persons with their cousins, since it is perfectly well known that the hearing members of a family in which deaf-mutism occurs, have often themselves such a possession of the defect as to make it potential in reproduction. A deaf-mute, therefore, in marrying his cousin, would do, more or less nearly, the same thing as if he had married another deaf-mute, so far as concerns his children. He would do this even if his cousin heard; but if he chooses a wife who is both his cousin and also like himself a deaf-mute, then the chances of the defect occurring among his children become nearly as great as he can make them.

These views, as to the way in which consanguinity in

* Buxton, *Causes of Deaf-dumbness*, p. 13.

parentage tends to injure the offspring, by no means exclude the possibility of there being also a something intrinsic in the consanguinity itself, which has the same tendency. Indeed, as already stated, it appears more than probable that such a something really exists.

Kinship in the parents may operate injuriously on the children in more ways than one. It does so, however, so far as my inquiries have shown, chiefly by giving an undesirable or dangerous force to transmissible qualities.

THE END.

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